Sunoco Facility: Marcus Hook
Report Title: Semi-Annual Consent Decree Compliance Report # 11
Reporting Period: 01/01/11 – 06/30/11

Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification

I. Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects

A. NOx Emissions Reductions from the FCCU

Engineering design work for Marcus Hook is progressing.

B. SO2 Emissions Reductions from the FCCU

Engineering design work for Marcus Hook is progressing.

C. Control of PM Emissions from FCCU

Paragraph 16 – Marcus Hook has been compliant with the 1.0 lbs/1000 lbs of coke burn PM requirement as demonstrated in June 2011 using a method 5 test.

D. Control of CO Emissions from FCCU

Paragraph 19 – Marcus Hook Refinery is compliant with the requirements of this paragraph. There were deviations to the one hour CO standard due to upsets. Deviations are reported separately in the quarterly and semiannual progress reports submitted to PADEP.

E. NSPS Subparts A and J Applicability at FCCU Regenerators

Paragraph 25 – Marcus Hook is compliant with Subparts A & J. There were deviations to the opacity standard. Deviations are reported separately in the quarterly and semiannual progress reports submitted to PADEP.

F. NO_x Emission Reductions from Heaters and Boilers

Paragraph 31 – The final detailed NOx Control Plan was submitted to EPA and the Appropriate Plaintiffs/Intervenors on 06/14/10. Per the June 2009 CD Amendment, the plan has been modified to delete any reduction from the Tulsa refinery

G. SO_2 Emissions Reductions from and NSPS Applicability for Heaters and Boilers

Paragraph 37 – No changes have been made since the last progress report.

I. Sulfur Recovery Plants - NSPS Applicability

Marcus Hook is compliant with Subpart J for Sulfur Plant/Tail gas Units. There were deviations to the 12-hr SO_2 standard.

J. Hydrocarbon Flaring Devices

Paragraph 48 – Alternative Monitoring Protocols ("AMPs") for the 10 Plant and 12 Plant Flares were submitted to EPA on November 12, 2008 and implemented beginning January 1, 2009. The AMPs were approved by the EPA on May 19, 2009.

The Alternative Monitoring Protocol for the Main (EC) Flare was submitted on September 2, 2010. An amended AMP inventory for the Main Flare was submitted on December 10, 2010. The amended AMP added a small number of flare connections found during a field audit while EPA review was ongoing. Also in that inventory a couple of flare connection were deleted as they did not exist in the field. The amended Summary of the AMP is attached. The AMP for the EC flare was implemented on January 1st, 2011. EPA approval of the AMP is pending.

K. Control of Acid Gas Flaring and Tail Gas Incidents

Paragraphs 52 & 53 – Sunoco had two Acid Gas incidents during this reporting period. One occurred on April 25th and one occurred on April 30th. Both incidents were reported as required. Copies of the reports are also attached here. These are the first Acid Gas incidents since February of 2007. There were no Tail Gas incidents.

L. Control of Hydrocarbon Flaring Incidents

Paragraph 64 – Marcus Hook had one Hydrocarbon Flaring incidents during this reporting period. The incident occurred on January 11, 2011 The Root Cause Failure Analysis investigation report is attached in Appendix I.

M. Benzene Waste NESHAP Program Enhancements

Paragraphs 65-77

1. **The BWON exempted quantity was calculated to be 1.21E-01 MG for the first quarter and 8.35E-02 MG for the second quarter of 2011. The 2011 annual BWON exempted quantity, based on EOL sampling, is calculated to be 4.09E-01 MG based on samples listed in Appendix II.**
2. **A laboratory audit of Lancaster Laboratories was conducted on 03/02/11 and Jones & Henry on 05/24/11. Both audits were conducted by Environmental Standards, Inc., and the reports are included with this report.**

N. Leak Detection and Repair Program Enhancements

Paragraphs 78-92

1. **LDAR Monitoring Technician Refresher Training is conducted by Team Inc on a monthly basis. LDAR Technicians received facility refresher training in December 2010.**

2. **Result of Third Part Audit and Corrective Actions.**

   A Third Part Audit of the facility LDAR Program was conducted in August of 2010, covering the following areas:

- **Comparative monitoring;**
- **Observation of technician's calibration and monitoring techniques;**
- **Records review to ensure monitoring and repairs were completed in the required periods;**
- **Inventory review to ensure affected equipment has been identified and included in the facility LDAR program; and**
- **Review to ensure records and reports have been maintained and submitted as required.**
- **Open-ended line (OEL) control;**
- **Sample system flushing control; and**
- **LDAR monitoring routes.**

Based on this in-depth audit of the Sunoco MH LDAR program, Sage found the program to substantially comply (except for a few minor exceptions) with applicable Federal and State LDAR regulations, as well as the LDAR provisions of the Consent Decree.

The minor exceptions identified in the audit have been corrected and are summarized in the table, below:

Finding	Corrective Action
The audit found 38 untagged components which were not included in the LDAR inventory.	All components have been added to LDAR Inventory. Regular systems review by unit is in place to prevent any others not being included on inventory.
Open-Ended Lines The audit found four (4) OELs not controlled by cap, plug, blind, or double block valves.	All 4 OELS were immediately repaired. A program is in place to prevent, identify and repair OELs

Thirty (30) MOCs dating back to January of 2009 were identified where there were equipment additions to the LDAR program, but the associated equipment was not inspected within 30 days of being placed into service.	An MOC review program is in place to identify changes to the plant with LDAR impact and schedule appropriate changes to the LDAR inventory. The MOCs identified were backlog from a period of time prior to this program being initiated. The MOC program is now current.
220 components (212 valves, 3 pumps, 3 PRVs, and 2 CLVS-H) in LeakDAS are designated as heavy liquid service but appear to be a light liquid and/or gas-vapor based on the Stream Description field (e.g., "Crude," "Crude Oil," "Naphtha," "P/P," etc.). These designations could be erroneous and should be verified.	These components have been reviewed and their designations corrected as needed.
There are 5 valves designated as DTMs in LeakDAS that do not meet the requirements for DTM classification. This designation was corrected during the audit.	These designations were corrected during the audit.
The audit team found a few deficiencies in reports submitted for the Consent Decree, NSPS, Refinery MACT, and HON. Sunoco will be changing the format of its reports	The format of these reports have been updated to clarify the information reported.

<u>O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)</u>

Paragraphs 93-96: The Marcus Hook Refinery is compliant with the requirements of these paragraphs. As required under the recently amended consent decree, Sunoco has submitted applications to the relevant permitting agency to cover the installation of SNCR on the Marcus Hook #3 CO Boiler and for the calendar year mass emissions limits for SO_2 (2011) and NOx (2012).

<u>II. Summary of (section V) Emissions Data</u>

Included herein.

<u>III. Description of Any Problems Anticipated with Meeting (section V) Requirements</u>

N/A

IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor

N/A

Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification

I. Progress Report for Each SCEP or SLEBP (section VIII)

Paragraph 104: Complete

Paragraph 105: Complete

Paragraph 106: Complete

Paragraph 107: Complete

Paragraph 108: Complete

Paragraph 109: Complete

II. Completed SCEP or SLEBP (section VIII)

A. Detailed Description of Each SCEP or SLEBP Project as Implemented

N/A

B. Brief Description of Any Significant Operating Problems Encountered

N/A

C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree

N/A

D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)

N/A

APPENDIX I

Marcus Hook

Hydrocarbon Flaring Incidents

Investigation Report for Acid Gas Flaring or Hydrocarbon Flaring Resulting in ≥ 500 lbs. of SO_2 Released

Date of Report:	2/22/11	**Incident Type:** (Check one)	☐ Acid Gas Flaring: ☒ Hydrocarbon Flaring:
Date(s) of Incident:	(Beginning) 01/10/11 (End) 01/19/11	**Flaring start/end time:**	**From: 12:00 01/10 To: 11:06 01/19**
Amount of SO_2 Released:	**10-4 Flare; 190,580 lbs** Pounds ☒ Tons ☐	**Location at the Marcus Hook Refinery:**	**12-3 Flare** ☐ **10-4 Flare** ☒ **EC Flare** ☐

Incident Description: The gases generated in the Fluid Catalytic Cracking (FCC) Unit are handled by a compressor that sends these gases to Sunoco's 15-2B Gas Plant. This compressor is identified as the #1 Clark Compressors. The #1 Clark Compressor is driven by a steam turbine.

In late December of 2010 and early January of 2011 a number of mechanical issues were identified with both the turbine and compressor ends of the #1 Clark. Lubricating oil was leaking from the turbine outboard bearing; as well as wet gas from the process was leaking into the lube oil system at the compressor end. The Rotating Equipment Engineering group suspected that the cause of the lube oil leak on the turbine was due to a partially plugged bearing housing (this finding was supported by the failure of the Bentley Nevada monitoring system on the outboard bearing). The wet gas leakage into the lube oil on the compressor end was believed to be the result of deposition build - up around the seals of the compressor which would cause an imbalance and elevated vibrations on the machine. Because of the environmental and safety concerns (FCC wet gas contains H_2S), as well as mechanical integrity issues associated with running the compressor with contaminated lube oil, it was decided to take the #1 Clark out of service to address these problems.

At approximately 12:00 noon, January 10, 2011, the FCC Unit's Clark Compressor underwent a shut down for maintenance (PADEP notified prior to the event). In preparation for the shut down, the unit rate was reduced to the minimum sustainable level. The FCC unit had some operational parameters changed (riser temps & conversion targets) to minimize wet gas production (this change in operation was not normal for profitable operation). With the FCC Unit's compressor shutdown the gasses were bypassed to the Gas Plant's Elliot Compressor. The remainder of the gas that could not be taken by that Elliot Compressor was sent to the 10 Plant Flare. With the greatly reduced gas rate about 2/3 of the FCC Unit's Wet Gases went to the Elliot Compressor and about 1/3 of the gases went to the 10 Plant flare.

The work at the FCC unit continued around the clock. Light stands were put in the area and all shifts were manned until the work was completed on 1/19/11. The compressor was opened and the rotor was pulled, the seals were replaced as necessary, the vibration monitoring equipment (Bentley Nevada) was repaired, and the compressor was returned to service. The repair work on the steam turbine outboard bearing was also done during the outage

Root Cause of Incident: Root cause of the flaring was the #1 Clark Compressor shutdown. The seal leakage on the compressor end was confirmed to be caused by a buildup of deposits.

Contributing Causes of Incident: **The compressor rotor gasoline wash system (designed to prevent deposit build - up) had no mechanism to confirm that adequate wash flow was occurring in normal operation. Instrumentation was improved during this outage that would confirm that adequate gasoline was flow was occurring.**

Preventive Actions (Actions to reduce likelihood of Recurrence): Repair unbalanced rotor assemble at the wet gas compressor - done 1/19/11

Repair as necessary the wet gas compressor gasoline wash system that will help prevent deposit build up on the rotor. Put a rotameter on the supply line - done 1/19/11.

Add natural gas purges on the compressor seals to prevent the process from contaminating the oil - done 1/19/11.

Do Stipulated Penalties Apply? (Acid Gas Flare Only) YES ☐ NO ☒

If YES explain:

- ☐ **Yes** ☐ **No** **Error resulting from careless operation**
- ☐ **Yes** ☐ **No** **Failure to follow written procedures**
- ☐ **Yes** ☐ **No** **Failure of equipment due to failure by Sunoco to operate and maintain equipment in a manner consistent with good engineering practices**
- ☐ **Yes** ☐ **No** **SO_2 rate greater than 20 lbs/hour continuously for 3 hours or more where Sunoco did not follow PMO plan and took no action to limit duration and/or quantity of SO_2 emissions**
- ☐ **Yes** ☐ **No** **Acid gas incidents more than 5 in rolling 12 months**

Hydrocarbon incident - non acid gas flaring.

If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:

N/A: ☐ **Completed:** ☒ **Not Completed:** ☐ **Explain:**
All corrective actions completed.

Approval Section		
Title	**Print Name**	**Date**
Environmental Engineer:	Paul J. Braun	2/22/11
Environmental Lead:	Scott Baker	3/14/11
Operations Manager:	Jon Hunt	3/21/11

Investigation Report for Acid Gas Flaring or Hydrocarbon Flaring Resulting in ≥ 500 lbs. of SO_2 Released

Date of Report:	05/26/11	**Incident Type:** (Check one)	☒ **Acid Gas Flaring:** ☐ **Hydrocarbon Flaring:**
Date(s) of Incident:	**(Beginning)** **04/25/11** **(End)** **04/25/11**	**Flaring start/end time:**	**From: 4:42 PM To: 6:22 PM**
Amount of SO_2 Released:	**EC Flare; 3142 lbs** Pounds ☒ Tons ☐	**Location at the Marcus Hook Refinery:**	**12-3 Flare** ☐ **10-4 Flare** ☐ **EC Flare** ☒

Incident Description:

An MEA system is used to remove H2S in Refinery Fuel Gas and some products in the refinery. MEA is an abbreviation for a chemical that has an affinity for H2S. The H2S free MEA (also called lean MEA) comes in contact with the product that needs to have H2S removed. The tower where the MEA comes in contact with the high H2S material is called a contactor or absorber. The MEA passes through the high H2S material (concurrent flow) in the absorber. The MEA picks up the H2S in the product stream. This high H2S MEA is now called rich MEA. The rich MEA is then sent to an MEA steam stripper where the H2S is removed. The concentrated H2S stream leaving the stripper is called acid gas. The acid gas stream is sent to the sulfur plant for further processing. The H2S stripped MEA (now called lean MEA) is recycled back to an MEA absorber to pick up more H2S from Refinery Fuel Gas or some products.

On April 25 at one of the MEA absorbers (T-12) at the 15-2S Gas Plant had inaccurate flow readings on the lean MEA going to that tower. The T-12 MEA absorber is used to remove H2S from a Propane Propylene (PP) Mix. This issue with the lean MEA flow resulted in level control issues at the MEA absorber's overhead accumulator (V-56). The purpose of the V-56 is to separate any residual MEA from P-P product. This overhead accumulator is located just downstream of the T-12 absorber. The result of the V-56 level issues was a large amount liquid flow being sent from V-56 via the lean MEA return line to the T-202 MEA stripper. The T-202 stripper had a sharp pressure increase which resulted in the tower being de-pressured to the flare as per design.

Root Cause of Incident: Root cause of the flaring was the inaccurate flow readings on the Lean MEA going to the MEA absorber (T-12) for Propane Propylene treating.

Contributing Causes of Incident:

Preventive Actions (Actions to reduce likelihood of Recurrence):

• Calibrate the lean MEA flow meter at T-12 – Completed in April
• Review incident with the operators at the 15-2S area – Completed in May.

Do Stipulated Penalties Apply? (Acid Gas Flare Only) YES ☐ NO ☒

If YES explain:

☐ **Yes** ☒ **No** **Error resulting from careless operation**
☐ **Yes** ☒ **No** **Failure to follow written procedures**
☐ **Yes** ☒ **No** **Failure of equipment due to failure by Sunoco to operate and maintain equipment in a manner consistent with good engineering practices**
☐ **Yes** ☒ **No** **SO_2 rate greater than 20 lbs/hour continuously for 3 hours or more where Sunoco did not follow PMO plan and took no action to limit duration and/or quantity of SO_2 emissions**
☐ **Yes** ☒ **No** **Acid gas incidents more than 5 in rolling 12 months**

This was the first acid gas flaring since February 2007.

If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:

N/A: ☐ **Completed:** ☒ **Not Completed:** ☐ **Explain:**
All corrective actions completed.

Approval Section

Title	Print Name	Date
Environmental Engineer:	Paul J. Braun	05/26/11
Environmental Lead:	Scott Baker	05/26/11
Operations Manager:	Jon Hunt	06/01/11

Investigation Report for Acid Gas Flaring or Hydrocarbon Flaring Resulting in ≥ 500 lbs. of SO_2 Released

Date of Report:	05/27/11	**Incident Type:** (Check one)	☒ **Acid Gas Flaring:** ☐ **Hydrocarbon Flaring:**
Date(s) of Incident:	(Beginning) **04/30/11** (End) **04/30/11**	**Flaring start/end time:**	**From: 3:16 PM To: 3:46 PM**
Amount of SO_2 Released:	**EC Flare; 882 lbs** Pounds ☒ Tons ☐	**Location at the Marcus Hook Refinery:**	**12-3 Flare** ☐ **10-4 Flare** ☐ **EC Flare** ☒

Incident Description:

An MEA system is used to remove H2S in Refinery Fuel Gas and some products in the refinery. MEA is an abbreviation for a chemical that has an affinity for H2S. The H2S free MEA (also called lean MEA) comes in contact with the product that needs to have H2S removed. The tower where the MEA comes in contact with the high H2S material is called a contactor or absorber. The MEA passes through the high H2S material (concurrent flow) in the absorber. The MEA picks up the H2S in the product stream. This high H2S MEA is now called rich MEA. The rich MEA is then sent to an MEA steam stripper where the H2S is removed. The concentrated H2S stream leaving the stripper is called acid gas. The acid gas stream is sent to the sulfur plant for further processing. The H2S stripped MEA (now called lean MEA) is recycled back to an MEA absorber to pick up more H2S from either fuel gas or refinery products.

On April 30 at the MEA stripper (T-202) had a rapid spike in temperature and pressure. The T-202 MEA steam stripper is used to strip H2S from rich MEA. Once this tower hit the set point it resulted in the tower being de-pressured to the flare as per design.

Review of the incident indicated that a sudden loss of cooling water at the stripper's cooling tower resulted in the pressure and temperature spike. The induced air cooling tower has two cooling tower fans. One Fan had been out of service for a motor replacement. The second fan had a coupling that failed abruptly. Although there was water circulating in the cooling tower system it was too hot to control the process.

To Mitigate the flaring, Operators sprayed firewater into the cooling tower to cool the water flow and the flaring ceased within 30 minutes.

Root Cause of Incident: **Root cause of the flaring was a mechanical breakdown of the coupling on the induced fan on the MEA stripper cooling tower. The cooling water temperature increase due to the fan outage resulted in high temperature and pressure at T-202 and subsequent flaring.**

Contributing Causes of Incident: **Other induced air fan had been out for a motor replacement.**

Preventive Actions (Actions to reduce likelihood of Recurrence):

- Put cooling towers on an automatic annual coupling inspection program (enter it into our preventive maintenance system) – Completed in May
- Return both cooling tower fans to service. - completed in May.

Do Stipulated Penalties Apply? (Acid Gas Flare Only) YES ☐ NO ☒

If YES explain:

☐ **Yes** ☒ **No** **Error resulting from careless operation**
☐ **Yes** ☒**No** **Failure to follow written procedures**
☐ **Yes** ☒ **No** **Failure of equipment due to failure by Sunoco to operate and maintain equipment in a manner consistent with good engineering practices**
☐ **Yes** ☒ **No** **SO_2 rate greater than 20 lbs/hour continuously for 3 hours or more where Sunoco did not follow PMO plan and took no action to limit duration and/or quantity of SO_2 emissions**
☐ **Yes** ☒ **No** **Acid gas incidents more than 5 in rolling 12 months**

This was the second acid gas flaring since February 2007.

If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:

N/A: ☐ **Completed:** ☒ **Not Completed:** ☐ **Explain:**
All corrective actions completed.

Approval Section

Title	Print Name	Date
Environmental Engineer:	Paul J. Braun	05/27/11
Environmental Lead:	Scott Baker	05/27/11
Operations Manager:	Jon Hunt	06/01/11

Appendix II

Sunoco Marcus Hook Refinery

2011 Total Benzene Summary

Unit	2011 1Q Exempt Benzene Total	2011 1Q Exempt Benzene Total	2011 2Q Exempt Benzene Total	2011 2Q Exempt Benzene Total	2010 3Q Exempt Benzene Total	2010 3Q Exempt Benzene Total	2010 4Q Exempt Benzene Total	2010 4Q Exempt Benzene Total	*Projected Total for Year*
	lb	Mg	lb	Mg	lb	Mg	lb	Mg	*Mg*
Spills	0.00E+00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	***0.00E+00***
Waste	3.00E+00	1.36E-03	0.08	1.12E-02	17.15	7.78E-03	1.72E+01	1.08E-03	***2.14E-02***
Dock Pans	1.56E+02	7.08E-02	159.34	7.23E-02	159.31	7.23E-02	168.00	9.12E-02	***3.07E-01***
Exchanger Cleanouts	1.08E+02	4.90E-02	5.85E+01	**3.60E-05**	**0.0**	**0.00E+00**	**0.0**	**0.00E+00**	
Total Quarterly Benzene		**1.21E-01**		**8.35E-02**					
PROJECTED Annual Total Exempt Benzene for the year ***(as of quarter indicated)***[1][2]		**4.84E-01**		**4.09E-01**					

Sunoco Facility: Philadelphia
Report Title: Semi-annual Consent Decree Compliance Report # 11
Reporting Period: 01/01/11 – 06/30/11

Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification

I. Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects

A. NOx Emissions Reductions from the FCCU

Paragraphs 12 – 13: There were no NOx exceedances of the CD limits during the period.

B. SO2 Emissions Reductions from the FCCU

Paragraphs 14 – 15: The Philadelphia Refinery is compliant with the requirements of these paragraphs. There were no SO2 exceedances of the CD limits during the period.

C. Control of PM Emissions from FCCU

Paragraph 16 – The Philadelphia Refinery is compliant with the requirements of this paragraph.

D. Control of CO Emissions from FCCU

Paragraph 19 – There were no consent decree CO exceptions noted during the reporting period pursuant to paragraph 19.

Paragraph 20 – Philadelphia Refinery is compliant with the requirements of this paragraph.

E. NSPS Subparts A and J Applicability at FCCU Regenerators

Paragraphs 24 – 25: There were no Subpart A or J exceptions during the reporting period.

However, an emergency shutdown and associated startup of the 868 unit on May 10th caused opacity levels above the permit limits, the opacity was below 30% and therefore not a Subpart J opacity exception. Deviations are reported separately in the quarterly and semiannual reports.

F. NO_x Emission Reductions from Heaters and Boilers

Paragraph 31– All work has been completed. We received a final permit for new NOx limits for the 210 unit H-201 heater in February, 2011.

G. SO_2 Emissions Reductions from and NSPS Applicability for Heaters and Boilers

On December, 31, 2010, all refinery heaters and boilers became subject to NSPS J. Sunoco submitted a plan approval application to Philadelphia Air Management Services to incorporate these limits into a permit. A draft of this permit was received in July, 2011.

Paragraphs 36 – 38: In accordance with the Consent Decree Appendix D, all remaining refinery heaters and boilers became subject to NSPS Subpart J. There were three events that caused exceedance of the three hour rolling average H_2S limit at NSPS Subpart J regulated heaters as shown below:

On April 5-6, during startup of the 1232 FCCU, hydrocarbon was sent to the 1232 gas MDEA absorber and ultimately to the 867 MDEA regenerator. This hydrocarbon impacted the ability to absorb H2S in the fuel gas, resulting in elevated H2S in the refinery fuel gas until the hydrocarbon could be removed from the MDEA system. The 3 hour average level of H2S was above the 162 ppm limit for 5 hours for 8 heaters and boilers on the Girard Point side and 3 heaters for 19 hours on the Point Breeze side.

On April 11, a power failure at a portion of the Point Breeze side of the refinery let to the sudden shutdown of the 867 Sulfur Recovery Unit. Acid gas regeneration was curtailed for a short time resulting in an H2S spike in the fuel gas. The 3 hour average H_2S in fuel gas was over 162 ppm (174 ppm) for one hour for 11 Girard Point heaters and boilers and 3 hours (184, 260, 208 ppm) for 3 Point Breeze heaters.

On May 16, an upset at the 868 unit led to hydrocarbon in the MDEA that caused a sudden short duration increase in the H_2S level in refinery fuel gas. The 3 hour average H_2S in fuel gas was over 162 ppm (219 ppm) for 15 Point Breeze heaters.

I. Sulfur Recovery Plants - NSPS Applicability

Paragraphs 40 – 47: The Philadelphia Refinery is compliant with the requirements of these paragraphs. Please note that after the acid gas and sour water gas feed was stopped to both sulfur recovery plants during the April 5-6 event describe above, SO_2 levels in both tail gas unit incinerators were elevated for several hours. These emissions are excluded from these paragraphs and NSPS requirements. Deviations are reported separately in the quarterly and semiannual reports.

J. Hydrocarbon Flaring Devices

Paragraphs 48 – 50: The following is a summary of options the Philadelphia Refinery has elected to comply with regarding the CD NSPS requirements for flares.

Philadelphia Flares	Compliance Status
PB North Yard LPG Flare	NSPS. Have an approved AMP. Please note that a request to revise this approved AMP was submitted to USEPA and approved by them in April, 2010.
PB South Yard North Flare	NSPS. Operating and maintain a flare gas recovery system.
PB 867 Acid Gas Flare	NSPS. This is not currently a fuel gas combustion device. The purge and pilot gas is comprised of purchased natural gas. When the purge and pilot gas is converted to refinery fuel gas, that gas will be monitored to be compliant with Subpart J. The flare only receives non-routinely generated gases; process upset gases, fuel gas released as a result of relief valve leakage or gases released due to other emergency malfunctions.
PB 867 SWS Gas Flare	NSPS. This is not currently a fuel gas combustion device. The purge and pilot gas is comprised of purchased natural gas. When the purge and pilot gas is converted to refinery fuel gas, that gas will be monitored to be compliant with Subpart J. The flare only receives non-routinely generated gases, process upset gases, fuel gas released as a result of relief valve leakage or gases released due to other emergency malfunctions.
GP 1231/1232 Flares	NSPS status began12/31/2010. AMP submitted in July, 2010 and approved by EPA in June, 2011.
GP 433 Flare	NSPS status began 12/31/2010. AMP submitted in July, 2010 and approved by EPA in June, 2011.

K. Control of Acid Gas Flaring and Tail Gas Incidents

Paragraphs 51 – 63: Acid gas flaring computational methods have been in place since the DOE. There were no AG flaring events to note for this reporting period.

L. Control of Hydrocarbon Flaring Incidents

Paragraph 64:
No Hydrocarbon Flaring Incidents occurred during this reporting period.

All planned work on the April 17, 2010 Hydrocarbon Flaring Incident that was reported in the July 2010 semi-annual report was completed by the anticipated due date of January 1,

2011. As a result of this review, some equipment changes were completed during a partial planned process outage that occurred during the first semi-annual period of 2011

M. Benzene Waste NESHAP Program Enhancements

Paragraphs 65-77

1. **The following BWON training was conducted over this semi-annual period: (a) Site BWON Coordinator received annual training on sampling and analysis procedures.**

2. **The BWON exempted quantity was calculated to be, based on EOL sampling data, 0.154 MG for the first quarter and 0.019 MG for the second quarter of 2011. The projected 2011 annual BWON exempted quantity, based on EOL sampling is calculated to be 0.35 MG. See Appendix II for EOL sampling results.**

3. **A laboratory audit of Lancaster Laboratories was conducted on 03/02/11 and Jones & Henry on 05/24/11. Both audits were conducted by Environmental Standards, Inc., and the reports are included with this report.**

N. Leak Detection and Repair Program Enhancements

Paragraphs 78 – 92: The Philadelphia Refinery is compliant with the requirements of these paragraphs.

The third LDAR Third-Party Compliance Audit was complete as of 12/22/2010, and is included as an Adobe Acrobat file on the attached compact disc. See Appendix I for a description of corrective actions taken in 2010 in response to that audit.

All corrective actions for audit findings identified in the 2008 LDAR Third Party Compliance Audit were completed in 2008 and 2009, as reported in the July 2009 Consent Decree Semi-Annual Report. Seven of the eleven corrective actions for audit findings identified in the 2010 LDAR Third Party Compliance Audit findings were completed in the first half of 2011.

No changes were made to the program during the reporting period and the required certifications have been already submitted as required in Paragraph 92(b).

Information required under Paragraph 92(c) will be submitted in the first semiannual report of 2011 under 40 CFR 63.654.

O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)

Paragraphs 93 – 96: The Philadelphia Refinery is compliant with the requirements of these paragraphs. Please note that in March, 2011, the Refinery submitted a plan approval application to incorporate NSPS J requirements on all remaining refinery heaters, boilers and flares.

<u>II. Summary of (section V) Emissions Data</u>

Included herein.

<u>III. Description of Any Problems Anticipated with Meeting (section V) Requirements</u>

None

<u>IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor</u>

None

Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification

<u>I. Progress Report for Each SCEP or SLEBP (section VIII)</u>

Paragraph 104: All required work was completed during this report period and the SCR unit for the H-400 and H-401 heaters was in service on December 30, 2010. Some minor work post construction punch list work was completed in the first half and some minor touch up painting remains that will be completed in the third quarter of 2011.

Paragraph 105: Complete

Paragraph 106: Complete

Paragraph 107: Complete

Paragraph 108: Complete

Paragraph 109: Complete

Paragraph 110: A cost report for the SCR unit for the H-400 and H-401 heaters will be submitted in the third quarter once payment has been made for all remaining minor work.

<u>II. Completed SCEP or SLEBP (section VIII)</u>

<u>A. Detailed Description of Each SCEP or SLEBP Project as Implemented</u>

None

<u>B. Brief Description of Any Significant Operating Problems Encountered</u>

None

C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree

If applicable, see the certification behind the cover letter.

D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)

N/A

APPENDIX I

Philadelphia
LDAR Third-Party Audit 2010
Response and Corrective Actions

Responses and 2010 Corrective Actions to the October 8, 2010 Third-Party LDAR compliance audit findings for the Philadelphia Refinery are listed below:

Finding # 1. Twenty-five (25) valves with readings greater than 200 ppm that technicians were authorized to repair did not receive an initial repair attempt by the end of the next calendar day as required by the CD.

Additional Quality Assurance/Quality Control procedures will be established for the data processor at the facility to ensure all first attempts are completed within the required timelines. Additional training will be provided to the monitoring technicians to reinforce their requirement for making first attempts.

Finding # 2. One hundred and thirty-nine (139) valves in the 866 unit were not monitored within 30 days of being placed into VOC service. The valves were initially categorized as Heavy Liquid components, and received a visual inspection. The initial instrument inspections for the components were performed two months later.

A retagging project occurred at this facility between January 1, 2007 and December 31, 2008. During that time, components that already existed in the database were assigned new tag numbers to ensure that future monitoring could be routed in an efficient manner. The history associated with the old tag number was not assigned to the new tag number, making it impossible to determine if the one hundred and thirty-nine (139) valves received an initial inspection within 30 days of being added to the program. Going forward, all tag history will be matched to the new tag numbers if a retag project is required and a review of the chemical stream names versus chemical states will be performed to ensure that the correct chemical states are being utilized consistently throughout the facility. In addition, a review of each process units P&ID drawings will be performed with a technical service engineer prior to completing any future system reviews of each area.

Finding # 3. The audit identified two (2) chronic-leaker valves (tag #'s 433 4626 and 433 5839) which were not repacked or replaced (or similar repair) at the next process unit turnaround, nor had the components not leaked for at least six consecutive calendar quarters prior to the turnaround.

A more rigorous program has been established to assure that chronic leakers are maintained on the chronic leaker list. Once a component has been added it may only be removed from the chronic leaker list after demonstration to the Refinery Environmental Manager for his or her approval that the leaker has been fixed or not leaked in accordance with the consent decree definitions.

<u>Finding # 4</u>. One hundred and twenty (120) valves were not monitored for 2 successive months after a leak greater than or equal to the regulatory leak definition (500 ppm for NSPS VVa or 10,000 ppm for NSPS VV) was detected.

The facility is using the LeakDAS database to schedule and track all of the monitoring requirements for LDAR components. When a leak is detected, the software automatically assigns the component for 2 successive months of monitoring. The facility will work with the developers of the LeakDAS software to pinpoint the cause of the scheduling errors associated with this finding since it is believed to be the result of a programming issue within the code of LeakDAS.

<u>Finding # 5</u>. Difficult-to-monitor (DTM) and normal-to-monitor valves may have not been monitored at either annual or quarterly monitoring frequencies as required.

A retagging project occurred at this facility between January 1, 2007 and December 31, 2008. During that time, components that already existed in the database were assigned new tag numbers to ensure that future monitoring could be routed in an efficient manner. The history associated with the old tag number was not assigned to the new tag number, making it impossible to determine if the valves were monitored at the annual and quarterly frequencies required. Going forward, all inspections will be monitored according to the schedule outlined in the LeakDAS database. If any additions are made to the inventory through the Management of Change (MOC) process, LeakDAS rule assignments will be verified before being incorporated into the LDAR database.

<u>Finding # 6</u>. Two thousand (2,000) valves were identified for which a second monthly monitoring event could not be identified after the components were added to the LDAR program (added based on DateAdded field information currently in the LDAR recordkeeping database). However, due to re-tagging projects at the site, many of these valves may not have been newly-installed, but were simply retagged and recorded as a newly added component to the LDAR program.

A retagging project occurred at this facility between January 1, 2007 and December 31, 2008. During that time, components that already existed in the database were assigned new tag numbers to ensure that future monitoring could be routed in an efficient manner. The history associated with the old tag number was not assigned to the new tag number, making it impossible to determine if the two thousand (2,000) valves received a second monitoring event after being added to the program. Going forward, all inspections will be monitored according to the schedule outlined in the LeakDAS database. If any additions are made to the inventory through the Management of Change (MOC) process, LeakDAS rule assignments will be verified before being incorporated into the LDAR database.

<u>Finding # 7</u>. Approximately fifty (50) inspections for twenty-five (25) process relief/safety valves were not performed on a quarterly basis due to safety policies/concerns. Exemptions from monitoring requirements due to safety issues are allowed if approved by the State, but no documentation indicating approval could be located.

The facility was unable to determine if a prior request had been made and will request approval from Philadelphia Air Management Services to exempt these components from monitoring due to safety issues.

Finding # 8. The audit found ten (10) open-ended lines (OELs) without control by cap, plug, blind, or double block valves. This represents an uncontrolled rate of 0.5% based on inspecting about an estimated two thousand (2,000) potential OELs.

All refinery personnel have been provided initial and annual refresher Environmental training which emphasizes open-ended line compliance. Auditing of open-ended lines is performed daily by the LDAR monitoring technicians in addition to the daily auditing performed by operations personnel during their rounds. Starting in June, 2010, any OEL that is detected is discussed during daily meetings to re-emphasize that these must not occur.

Finding # 9. The audit identified/field-verified seven (7) tagged valves in the 868 unit associated with 8V-102, which are documented as in heavy liquid service, but which are in gas-vapor service (these components are located on top of sight glasses). Accordingly, this equipment has not been receiving quarterly inspection (only annual inspections under the PA Code 129.58 requirements).

A review of the chemical stream names versus chemical states will be performed to ensure that the correct chemical states are being utilized consistently at 868 unit and throughout the facility. In addition, a review of each process units P&ID drawings will be performed with a technical service engineer prior to completing any future system reviews of each area.

Finding # 10. The field audit found one hundred and seven (107) components without tags that do not appear to be in the LDAR database. This represents a tagging error rate of about 1.1% based on inspection about an estimated ten thousand (10,000) components.

The components identified will be incorporated into the LDAR program and a review of the chemical stream names versus chemical states will be performed to ensure that the correct chemical states are being utilized consistently throughout the facility. In addition, a review of each process units P&ID drawings will be performed with a technical service engineer prior to completing any future system reviews of each area.

Finding # 11. The site Refinery MACT report for first half 2010, where CD LDAR information is required to be reported, contains a list of equipment added to the "delay of repair" list during the semiannual period, but does not include "all equipment currently on the "delay of repair" list and the date each component was placed on the list". The report also does not contain "the number of repair attempts not completed according to the timeframes in Paragraph 90" (Delay of Repair and Required Repairs), although previous reports may have contained this information.

All components currently on the delay of repair list will be included in the Refinery MACT semiannual report in addition to any components not repaired as required in Paragraph 90.

APPENDIX II
Philadelphia Refinery

1. CD Paragraph 77(B)(i)(3) Sampling Results Philadelphia Refinery

Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 1st Qtr 2011 Benzene Conc. (ppmw)	Avg 2nd Qtr 2011 Benzene Conc. (ppmw)	1st Qtr 2011 Flow (gal)	2nd Qtr 2011 Flow (gal)	1st Qtr 2011 Benzene Quantity (Megagrams)	2nd Qtr 2011 Benzene Quantity (Megagrams)
210 Box Cooler (PB EOL 001)	01/10/11	0.00099	0.004		74235000		0.001	0.0003
	02/08/11	0.009						
	03/14/11	0.003						
	04/11/11	0.002		0.001		74235000		
	05/10/11	0.00099						
	06/06/11	0.00099						
Klondike Effluent (PB EOL 002)	01/10/11	0.00099	0.004		10000000		0.0002	0.0003
	02/08/11	0.011						
	03/14/11	0.001						
	04/11/11	0.018		0.007		10000000		
	05/10/11	0.00099						
	06/06/11	0.00099						
867 Effluent (PB EOL 003)	01/11/11	0.00099	0.007		22625000		0.0006	0.0004
	02/09/11	0.00099						
	03/15/11	0.02						
	04/11/11	0.012		0.005		22625000		
	05/11/11	0.00099						
	06/07/11	0.00099						
PB Grit Chamber Effluent (PB EOL 004)								
No samples taken this period - not required. Grit chamber samples were only required to be sampled for one quarter and this had already occurred in early 2008.								

Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 1st Qtr 2011 Benzene Conc. (ppmw)	Avg 2nd Qtr 2011 Benzene Conc. (ppmw)	1st Qtr 2011 Flow (gal)	2nd Qtr 2011 Flow (gal)	1st Qtr 2011 Benzene Quantity (Megagrams)	2nd Qtr 2011 Benzene Quantity (Megagrams)
1232 4th and M (GP EOL 001)	01/10/11	0.16	0.57		71500000		0.15	0.01
	02/08/11	1.5						
	03/15/11	0.063						
	04/11/11	0.065		0.042		71500000		
	05/10/11	0.032						
	06/07/11	0.03						
231 F Box Discharge (GP EOL 002)	01/11/11	0.091	0.19		3450000		0.002	0.007
	02/09/11	0.44						
	03/15/11	0.03						
	04/11/11	0.15		0.52		3450000		
	05/11/11	0.019						
	06/07/11	25.0 (P) 0.17 (W)						

For the June 2011 sampling event, 5% product (P) and 95% water (W) was observed. For all other months during this semi-annual period, 100% water (no product) was observed.

Sample Point ID	Sample Date	Benzene Conc (ppmw)	Avg 1st Qtr 2011 Benzene Conc. (ppmw)	Avg 2nd Qtr 2011 Benzene Conc. (ppmw)	1st Qtr 2011 Flow (gal)	2nd Qtr 2011 Flow (gal)	1st Qtr 2011 Benzene Quantity (Megagrams)	2nd Qtr 2011 Benzene Quantity (Megagrams)
231 Groundwater (GP EOL 003)	01/2011	*No sample	*0		0		*0	*0
	02/2011	*No sample						
	03/2011	*No sample						
	04/2011	*No sample						

	05/10/11	*No sample		*0		0		
	06/08/11	*No sample						
* Groundwater system not operational at the time of sampling.								
#3 Separator Effluent (GP EOL 004)	01/10/2011	0.001	0.001		3150000		0.00001	0.00001
	02/08/11	0.00099						
	03/14/11	0.00099						
	04/11/11	0.00099		0.00099		3150000		
	05/10/11	0.00099						
	06/06/11	0.00099						
8 Separator Effluent (GP EOL 005)	01/11/11	0.00099	0.01		8300000		0.0003	0.0003
	02/08/11	0.001						
	03/14/11	0.035						
	04/11/11	0.00099		0.01		8300000		
	05/10/11	0.018						
	06/06/11	0.012						
15 Pumphouse (PB Non-EOL 001)	01/10/11	0.001	0.001		15000		0.00000006	0.0000006
	02/08/11	0.00099						
	03/14/11	0.001						
	04/11/11	0.00099		0.01		15000		
	05/10/11	0.014						
	06/06/11	0.018						
Sample Point ID	**Sample Date**	**Benzene Conc (ppmw)**	**Avg 1st Qtr 2011 Benzene Conc. (ppmw)**	**Avg 2nd Qtr 2011 Benzene Conc. (ppmw)**	**1st Qtr 2011 Flow (gal)**	**2nd Qtr 2011 Flow (gal)**	**1st Qtr 2011 Benzene Quantity (Megagrams)**	**2nd Qtr 2011 Benzene Quantity (Megagrams)**
1232 Sewer M Street (GP EOL 006)	01/10/11	0.002	0.007		4700000		0.0001	0.0002
	02/08/11	0.001						
	03/15/11	0.017						
	04/11/11	0.021		0.009		4700000		
	05/10/11	0.004						

	06/07/11	0.002						
V-4 Hydrocarbon Separator Condensate Wash (GP Non-EOL 001)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No waste was generated from this Non-EOL point during the semi-annual period.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
V-603 Debutanizer Receiver Condensate Wash (GP Non-EOL 002)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No waste was generated from this Non-EOL point during the semi-annual period.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1st Qtr 2011 EOL Sampling TAB = 0.154 Megagrams
2nd Qtr 2011 EOL Sampling TAB = 0.019 Megagrams

Projected annual 2011 EOL sampling TAB = 0.35 Megagrams

Notes:

1. *Benzene concentrations listed as 0.00099 ppm were reported by the laboratory as < 0.001 ppm which is the detection limit.*

2. *Average quarterly benzene concentrations are simply the arithmetic mean of the individual laboratory results for the quarter.*

3. Sample calculation of 1st Qtr Benzene Quantity for GP EOL 002:

1st Qtr avg benzene conc. = 0.19 ppm
1st Qtr flow = 3,450,000 gallons

So: $$\frac{\text{0.19 ppm benzene x 3,450,000 gallons x 8.34 lbs/gallon}}{\text{2204.6 lbs/megagram x 1,000,000 parts per million}} = \text{0.002 Megagrams}$$

Sunoco Facility: Toledo Refinery
Report Title: Semi-annual Consent Decree Compliance Report # 11
Reporting Period: 01/01/11 – 06/30/11

Paragraph 114 Reporting and Recordkeeping of Affirmative Relief / Environmental Projects and Emission Data in Section V with Certification

Please note that until February 28, 2011, the Toledo refinery was owned and operated by Sunoco Inc., (R & M). On March 1, 2011, ownership of the Toledo refinery was transferred to Toledo Refining Company LLC, a subsidiary of PBF Holding Company LLC. Sunoco is in the process of amending the agreement to separate the Toledo refinery into a separate agreement. Since the amendment is not yet finalized, Sunoco is providing the semiannual report for the first half of 2011 for the facility. Once the amendment is final, Toledo Refining Company will provide the updates.

<u>I Progress Report for Implementation of (section V) Affirmative Relief/Environmental Projects</u>

<u>A. NOx Emissions Reductions from the FCCU</u>

The SCR construction was completed and unit started up in September 2009. NOx emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA

<u>B. SO2 Emissions Reductions from the FCCU</u>

Wet Gas Scrubber construction was completed and unit started up in September 2009. SO_2 emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA

<u>C. Control of PM Emissions from FCCU</u>

Wet Gas Scrubber (with particulate control) construction was completed and unit started up in September 2009. Alternative Monitoring plan is in place to monitor particulate removal efficiency. The AMP target values were set during the January 2010 performance testing. Deviations are reported separately in the quarterly and semiannual progress reports submitted to Ohio EPA.

<u>D. Control of CO Emissions from FCCU</u>

The Toledo Refinery is monitoring CO compliance as required. Deviations are reported separately in the quarterly and semiannual progress reports submitted to Ohio EPA.

<u>E. NSPS Subparts A and J Applicability at FCCU Regenerators</u>

The SCR and Wet Gas Scrubber (with particulate control) construction was completed and units started-up in September 2009. The PTI for the FCC Unit construction specified that NSPS is applicable to the FCCU regenerator.

F. NO_x Emission Reductions from Heaters and Boilers

The final detailed NOx Control Plan was submitted to EPA and the Appropriate Plaintiffs/Intervenors on 06/14/2010. Per the June 2009 CD Amendment, the plan has been modified to delete any reduction from the Tulsa refinery

G. SO_2 Emissions Reductions from and NSPS Applicability for Heaters and Boilers

Construction of the new SRU and two new Tail Gas Treating Units was completed during the 4th quarter of 2009. Both SRU/TGTU trains were in service by 12/31/2009. The new SRU/TGTU complex includes back up amine treating capability for the fuel gas system during turnarounds of the refinery amine unit.

New fuel gas analyzers were installed and various vents were reconfigured in the refinery fuel gas system during the 4th quarter of 2009. The new analyzers were placed in service in December 2009.

I. Sulfur Recovery Plants - NSPS Applicability

Construction of the SRU and two new tail gas units was completed during the 4th quarter of 2009. Both SRU/TGTU trains were in-service by 12/31/2009. SO_2 emissions are being monitored as required. Deviations are reported separately in the quarterly and semiannual reports submitted to Ohio EPA.

J. Hydrocarbon Flaring Devices

Sunoco received approval from USEPA for its Plant 4 flare Alternative Monitoring Plan in May 2010. The car seals specified in the plan are in place and the refinery is complying with monitoring specified. As described in the original monitoring plan, updates are to be submitted with subsequent reports.

The Plant 9 flare AMP was submitted to USEPA for approval in October 2010. The approval was received in December 2010. The car seals specified in the plan are in place and the refinery is complying with monitoring specified.

K. Control of Acid Gas Flaring and Tail Gas Incidents

Incident Investigation and Reporting program was implemented as of 03/14/06. There were no acid gas flaring incidents between 01/01/11 and 06/30/11.

L. Control of Hydrocarbon Flaring Incidents

Incident Investigation and Reporting program was implemented as of 03/14/06. One hydrocarbon flaring incident occurred between 01/01/11 and 06/30/11. Attached with this report is the hydrocarbon flaring incident report for the incident which occurred on 03/14.

M. Benzene Waste NESHAP Program Enhancements

1. **Required Training on BWON Controls has been implemented through:**
    - **Weekly Safety Topics for Refinery Employees.**
    - **HES Supervisory Training for Management & Supervision.**
    - **CA Training for Contract Administrators.**
    - **Sampling Procedure for BWON Coordinator.**
    - **Computer Based Learning for Refinery Employees.**

2. **The BWON exempted quantity was calculated for the first (0.13 MG) and second (0.13 MG) quarters of 2011. The projected BWON exempted quantity based on the calculations is well under the 2 MG exemption, which is currently estimated to be 0.5 MG.**

3. **A laboratory audit of Lancaster Laboratories was conducted on 03/02/11 and Jones & Henry on 05/24/11. Both audits were conducted by Environmental Standards, Inc., and the reports are included with this report.**

N. Leak Detection and Repair Program Enhancements

1. **Required Training on LDAR has been implemented through:**
    - **Weekly Safety Topics for Refinery Employees.**
    - **CA Training for Contract Administrators.**
    - **LDAR Contractor Training & Exams provided by EA, Inc.**
    - **Annual LDAR Refresher Training for LDAR Coordinator.**
    - **Computer Based Learning for Refinery Employees.**

2. **The LDAR Coordinator from 1/1 through 6/10/2011 was Stephenie Sibberson. The interim LDAR coordinator is Patricia Neuhart.**

3. **The biennial LDAR Internal Audit was completed by 12/08/10 as required by the CD. The audit report and corrective actions are attached to this report per paragraph 81 of the Consent Decree.**

O. Incorporation of Consent Decree Requirements into Federally Enforceable Permit(s)

An updated Title V permit application that included the CD requirements was submitted to Ohio EPA in accordance with Ohio EPA preferences during the 2nd half of 2006. The Permit-to Install for the CD control devices/refinery upgrades also included the CD requirements for emission limits and standards. The NSPS requirements for the remaining combustion devices were incorporated into a Permit-to-Install in April 2011.

TDES is in the process of revising the Toledo refinery facility Title Vpermit that will include the updated requirements.

II. Summary of (section V) Emissions Data

N/A

III. Description of Any Problems Anticipated with Meeting (section V) Requirements

N/A

IV. Additional Matters to be Brought to the Attention of EPA and the Appropriate Plaintiff/Intervenor

N/A

Paragraph 112 SUPPLEMENTAL AND COMMUNITY ENVIRONMENTAL PROJECTS (SCEP) AND STATE AND LOCAL ENVIRONMENTALLY BENEFICIAL PROJECTS (SLEBP) in Section VIII with Certification

I. Progress Report for Each SCEP or SLEBP (section VIII)

Activity completed and reported in previous semiannual report

II. Completed SCEP or SLEBP (section VIII)

Activity completed and reported in previous semiannual report

A. Detailed Description of Each SCEP or SLEBP Project as Implemented

None

B. Brief Description of Any Significant Operating Problems Encountered

None

C. Certification That Each Project Has Been Fully Implemented Pursuant to the Provisions of this Consent Decree

See the certification behind the cover letter.

D. Description of the Environmental and Public Health Benefits Resulting From Implementation of Each Project (including quantification of the benefits and pollutant reductions, where practicable)

N/A

APPENDIX I

Toledo Refinery

Hydrocarbon Flaring Incident

Toledo Refining Company

Investigation Report for Acid Gas Flaring, Hydrocarbon Flaring or Tail Gas Incidents Resulting in ≥ 500 lbs. of SO_2 Released

Date of Report:	4/28/2011		**Incident Type** (Check one)	**Acid Gas Flaring:** ☐ **Tail Gas Incident:** ☐ **Hydrocarbon Flaring** ☒
Agency Report #	1103-48-0812			
Date(s) of Incident:	(Beginning) 3/14/2011	(End) 3/14/2011	**1st Flaring start/end time:**	03/14 05:00 – 06:35
			2nd Flaring start/end time:	
			3rd Flaring start/end time:	
Amount of SO_2 Released:	See attached Form 0.29	Pounds ☐ Tons ☒	**Location at the Toledo Refinery:**	**Plant 4 Flare** ☒ **Plant 9 Flare** ☐ **SRU Incinerator Stack** ☐

Incident Description:

On 14-Mar-11, the FCC unit experienced a feed change that caused the unit to produce a low molecular weight wet gas product. The FCC wet gas compressor (C-421) could not effectively move this gas. Therefore, the C-421 spillback valves opened and as a result the suction pressure control valves opened allowing FCC wet gas to flow to the Plant 4 flare (P009). Flaring from C-421 suction was intermittent between 05:00 and 06:35. Operational changes were made in the refinery that would affect the wet gas composition so that the gas could be processed by the compressor and end the flaring.

Steps taken to limit duration of flaring or quantity of SO_2/Hydrocarbon released (Corrective Actions):

Refinery operating personnel made operational changes to limit the duration of this event. In order to change the composition of the gas to be processed, gasoline stabilizer tower vapor was redirected to the compressor. Also, the FCC gas plant absorber tower operating pressure was decreased to improve wet gas processing capability.

Root Cause of Incident:

The root cause of the incident was over-cracking of the FCC feed in the unit. High Concarbon in the feed can lead to periods of high gas and clarified slurry oil (CSO) make. FCC unit conversion will drop and regenerator carbon monoxide (CO) concentration increases as the catalyst cokes up. The result is excess gas production with a composition that is unable to be processed by the compressor.

Contributing Causes of Incident:

During the event, the refinery was experiencing changes in FCC Unit feed quality. However, all the typical parameters for monitoring showed within normal ranges. Initially, over-cracking was not suspected. However, after operational changes were made to correct an over-cracking condition, the flaring stopped.

Preventive Actions (Actions to reduce likelihood of Recurrence):

- Immediately following the incident, operational instructions were provided to improve monitoring and management of FCC feed and wet gas composition changes.
- The operational guidelines to prevent flaring at C-421 have been modified. The revisions identify FCC operating parameters to be monitored and adjusted to prevent over-cracking the FCC feed.
- This incident and the revised guidelines was reviewed with Operations supervision

Do Stipulated Penalties Apply?	YES	☐	NO	☒	

If YES explain:

If corrective actions are not completed within 45 days from the end date of the incident, list the projected date for the follow-up report which will show corrective actions and preventive actions:

N/A: ☐ **Completed:** ☒ **Not Completed:** ☐ **Explain:**

Approval Section

Title	Print Name	Signature	Date
Operations Manager:	J. Parsil	Original signed by JCP	4/28/2011
Environmental Manager:	N. Sahni	Original signed by NS	4/28/2011

Date of Incident:	03/14/2011	**Incident Type**	**Acid Gas Flaring:** ☐
Agency Report #	1103-48-0812	**(Check one)**	**Hydrocarbon Flaring** ☒
			Tail Gas Incident: ☐

Calculation of Quantity of SO_2 Released from Gas Flaring (Round to the nearest 0.1 Tons):

Tons of SO_2 = [FR][TD][ConcH_2S][$8.44x10^{-5}$] (See p. 52 of 114 CD)
FR = Average Flow Rate of Gas During Flaring Incident in scfh
TD = Total Duration of Flaring Incident in hours
ConcH_2S = Average Concentration of Hydrogen sulfide in gas during flaring incident
$8.44x10^{-5}$ = [lb mole H_2S/379 scf H2S][64 lbs SO_2/lb mole H_2S][1 Ton/2000 lbs]

Reason for any missing data: No data missing
Basis for any data that was estimated: Flows were estimated based on valve design data and process operating conditions during release. Concentrations were based on the most recent available lab data.

Release No. 1:
[(144,300 scfh)*(1.17 hrs)*(0.02 mol H_2S/mol gas]*(8.44E-05)] = 0.29 tons (576 lb)

Release No. 2:

Release No. 3:

Tons of SO_2 = 0.29 ton total SO2 released

Rate of SO_2 Emissions During Gas Flaring: ER = [FR][ConcH_2S][0.169]
ER = Emission Rate in pounds of SO2 per hour
Pounds per hour of SO_2 = [FR][ConcH_2S][0.169] (See p. 52 of 114 CD)
FR = Flow Rate of Gas During Flaring Incident in scfh
ConcH_2S = Average Concentration of Hydrogen sulfide in gas during flaring incident
0.169 = [lb mole H_2S/379 scf H_2S][1.0 lb mole SO_2/1 lb mole H2S][64 lbs SO_2/lb mole SO_2]

Reason for any missing data: No data missing
Basis for any data that was estimated: Flows were estimated based on valve design data and process operating conditions during release. Concentrations were based on the most recent available lab data.

Emission Rate of SO_2

Release No. 1: ER = : [144,300 scfh]*[0.02 mol H_2S/mol gas]*[0.169] = 487.7 lb SO2/hr

Release No. 2:

Comments:

	Name	Title	Date
Calculation Performed by:	L. Balogh	Env. Eng.	04/25/2011
Calculation Reviewed by:	E. Moore	Env. Team Leader	04/25/2011